JAPAN

EDICT OF GOVERNMENT

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JIS X 8341-2 (2004) (English): Guidelines for older persons and persons with disabilities -- Information and communications equipment, software and services -- Part 2: Information processing equipment

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The citizens of a nation must honor the laws of the land.

Fukuzawa Yukichi

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JAPANESE INDUSTRIAL STANDARD

Translated and Published by
Japanese Standards Association

JIS X 8341-2 : 2004

Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services—Part 2: Information processing equipment

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Reference number : JIS X 8341-2 : 2004 (E)

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

JIS X 8341 consists of the following 3 parts under the general title "*Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services*":

Part 1: *Common Guidelines*

Part 2: *Information processing equipment*

Part 3: *Web content.*

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services—Part 2: Information processing equipment

Introduction With the progress of information society, all people increasingly come to use the information processing equipment. This Japanese Industrial Standard has been developed as the guidelines to ensure information accessibility required mainly by older persons, persons with disabilities and persons with temporary disabilities when they use the information processing equipment and its peripheral device. This Standard specifies, based on JIS Z 8071 *Guidelines for standards developers to address the needs of older persons and persons with disabilities*, guidelines of specifications to attain. The common guidelines are given in Part 1 and the information processing equipment and its peripheral device without regard to hardware and software in Part 2.

1 Scope This part of JIS X 8341 specifies the matters to consider when planning, developing and designing the information processing equipment and its peripheral device in order to ensure information accessibility when mainly older persons, persons with disabilities and persons with temporary disabilities (hereafter referred to as "older persons and persons with disabilities") use the information processing equipment and its peripheral device.

Remarks 1 Use of this Standard for designing This Standard shall be referred to when the individual information processing equipment and its peripheral device are planned, developed, and designed. If there are separately any standards for product groups of specific fields, those standards shall be referred to. If there are not any standards for product groups of specific fields, JIS X 8341-1 shall be referred to. When this Standard is applied to the individual equipment, according to their types and other conditions, only appropriate items shall be selected from this Standard and applied. When the items are selected, the reason for selection and the content of consideration (function and performance) shall be clearly demonstrated.

2 Use of this Standard for evaluation When the information accessibility of the individual information processing equipment and its peripheral device is evaluated, this Standard shall be referred to. If there are separately any standards for product groups of specific fields, those standards shall be referred to. If there are not any standards for product groups of specific fields, JIS X 8341-1 shall be referred to. When this Standard is applied to the individual equipment, according to their types and other conditions, only appropriate items shall be selected from this Standard and applied.

3 Combined products of new concept For the combined products of new concept that are now being developed, such as the livingwares with the information processing function and communication function and that are not defined as the conventional information processing equipment and its peripheral device, this Standard should be applied. However, when standards with regard to those specific product groups are established, those standards shall be referred to.

Information : The characteristics of persons with some sort of disabilities are diverse. When they use the information processing equipment and its peripheral device they encounter different barriers, depending on each individuals case : for example, for the case of older persons, depending on their career, culture and the body region and severity of disabilities caused by aging, and for the case of persons with disabilities, depending on the body region, severity, time of occurrence and subsequent circumstances of disabilities. Therefore, it is desirable to realize, as far as possible, such interfaces that are as diverse as possible and to enable each user to select the most suitable one from among them.

There are several methods to realize various interfaces that are equipped with diverse functions and performance. They are: inclusion into standard configuration, supply of options, connection to assistive devices and so on. Furthermore, the realization techniques are also diverse. They are: realization by hardware, realization by software, utilization of outside sources through network and so on. This Standard assumes to correspond mainly to standard configuration, but further it assumes to correspond to these diverse realization methods as well, and aims to realize the respective necessary functions in the appropriate form to each user according to the technical advance and cost situation.

Information : The supplementary matter on the definition of users is described in annex 1 (informative).

Information : The supplementary matter on accessibility and usability is described in annex 2 (informative).

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of publication is given to these referred standards, only the edition of the indicated year constitutes the provision of this Standard but the revision and amendment made thereafter do not apply. The normative references without the indication of the year of coming into effect apply only to the most recent edition (including amendments).

JIS S 0013 *Guidelines for the elderly and people with disabilities—Auditory signals on consumer products*

JIS X 8341-1:2004 *Guidelines for older persons and persons with disabilities — Information and communications equipment, software and services—Part1: Common Guidelines*

JIS Z 8513 *Ergonomics—Office work with visual display terminals (VDTs)—Visual display requirements*

Remarks : ISO 9241-3:1992 *Ergonomic requirements for office work with visual display terminals — (VDTs) Part 3: Visual display requirements* is equivalent to the said standard.

JIS Z 8514 *Ergonomics — Office work with visual display terminals (VDTs) — Keyboard requirements*

Remarks : ISO 9241-4:1998 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 4: Keyboard requirements* is identical with the said standard.

JIS Z 8518 *Ergonomics — Office work with visual display terminals (VDTs) — Requirements for displayed colours*

Remarks : ISO 9241-8:1997 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 8: Requirements for displayed colours* is identical with the said standard.

JIS Z 8524 *Ergonomics—Office work with visual display terminals (VDTs)—Menu dialogues*

Remarks : ISO 9241-14:1997 *Ergonomic requirements for office work with visual display terminals(VDTs)—Part 14: Menu dialogues* is identical with the said standard.

JIS Z 8525 *Ergonomics — Office work with visual display terminals (VDTs) — Command dialogues*

Remarks : ISO 9241-15:1997 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 15: Command dialogues* is identical with the said standard.

ISO 9241-9:2000 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 9: Requirements for non-keyboard input devices*

ISO 13406-2:2001 *Ergonomic requirements for work with visual displays based on flat panels—Part 2:Ergonomic requirements for flat panel displays*

3 Definitions For the purposes of this Standard, the definitions specified in JIS X 8341-1 apply.

4 Basic principle The basic requirements for planners, developers and designers to ensure information accessibility of the information processing equipment and its peripheral device shall be as follows:

a) From the phases of plan, development and design, consider so that equipment can be operated and used by older persons and persons with disabilities.

Remarks : In order to enable all users to access information, from the phases of plan, development and design, information accessibility shall be ensured. The service range and employment of operators shall not be limited.

b) When the information accessibility to offer cannot be realized by a single function, one or more functions shall be combined to ensure information accessibility.

Remarks : The sensory, physical, and cognitive abilities of older persons and persons with disabilities deteriorate in a diverse way. Sometimes, a single solution is not sufficient and plural solutions or a combination of them are required, depending on the conditions and levels of the sensory, physical, and cognitive abilities to be addressed.

Furthermore, solution methods are not limited to hardware (including assistive devices) and software. A combination of them is allowed to offer functions which meet the requirements.

Furthermore, the basic and recommendation requirements in JIS X 8341-1:2004 shall be considered.

5 Basic requirements

5.1 Operation

5.1.1 Reduction of burden on sensory, physical and cognitive abilities Consider the visual, auditory and other sensory abilities; the physique, muscular strength and other physical abilities; and understanding, grasp and other cognitive abilities. Consider so that the operation does not impose any burden.

Example 1 The persons with visual disabilities can have difficulty in reading small characters users or feel burden to follow large characters.

Example 2 The users with auditory disabilities may feel burden to listen to the excessively low sound or the voice of unfavorable frequency bands, because they must be attentive not to fail to hear.

Example 3 The persons with a hearing aid, etc. may feel discomfort when they hear excessively loud sound.

Example 4 Some persons feel physical burden when operation needs a large force, repetition, intense motion, etc.

Example 5 If the persons who can only operate one-handed are forced operation to use both hands, then, they may be forced to take an unnatural posture: instead of a single hand, they are forced to use their face or an elbow.

Example 6 If operation is of multiple layers or requires reading and hearing of much information to understand, it may impose a burden on the cognitive ability.

5.1.2 Consistency of operation The consistency of operation shall be as follows:

a) Consider so that users can use the particular physical function, consistently obtain and grasp information, and operate.

Example 1 Users who cannot use a pointing device can consistently input only by the keyboard operation.

Example 2 Users who can operate it only one-handed can consistently input only with one-hand.

b) The consistency in a menu dialogue or a command dialogue shall be in accordance with JIS Z 8524 and JIS Z 8525.

Information : For the consistency in a menu dialogue or a command dialogue, the relevant provisions are extracted from JIS Z 8524 and JIS Z 8525 and are given in annex 3 (informative).

5.1.3 Prevention of operational errors Depending on the level of user's visual, auditory and other sensory abilities; physique, muscular strength and physical abilities; and understanding of sentences and other cognitive abilities, consider prevention of operational errors mistake made by a user.

Example 1 When there are various kinds of operation keys, in order to make them intelligible visually, change arrangement, colour scheme, contrast or shape of operation keys, print explanatory characters on each operation key. Such consideration shall be given when equipment is designed.

Example 2 If users with reduced muscular strength cannot continue to hold hands above the keyboard or tremor and involuntary movement of hands cause users to touch unintended keys, consider using a key guard and other assistive means when equipment is designed.

Example 3 When a user must make a response, use an intelligible text and large, legible characters. Use the voice in clear tone and in volume easy to hear. Such consideration shall be given when equipment is designed.

Example 4 It is desirable that a user can change character size, colour scheme, contrast, voice volume, speed, etc. by using the equipment or assistive devices. Such consideration shall be given when equipment is designed.

Example 5 For the persons with visual disabilities, marking tactile dots shall be attached to the key at the reference position of operation. A touch of the key shall produce auditory information such as the name and function of that key. Thus, the tactile sense and voice shall identify the right key. Such consideration shall be given when equipment is designed.

5.1.4 Cancellation of operational error Consider recovery from operational errors.

Example 1 An operation of multiple times is canceled one by one, and it can return to the previous status before each operation.

Example 2 When operational errors occur, and it takes a long time to return to the status before the operational errors, then, backup of file is acquired automatically and temporarily, so that recovery is possible.

5.1.5 Guide function for operation When offering the information on the operating instruction of hardware or software, consider so that a user can acquire it with plural means.

Example : When the operating instruction is offered in voice, it shall be displayed also in a text on a screen at the same time in consideration of persons who cannot hear voice or have difficulty in hearing voice.

5.1.6 Confirmation function In an operation, the following matter shall be able to be confirmed:

- Whether equipment is ready for use
- If there is any possibility that equipment cannot be used, presence or absence of that possibility
- Whether the intended input was done
- Result of operation

Example 1 When equipment is switched on and ready for use, equipment shall give, in addition to screen display, voice information.

Example 2 In order to inform of the possibility that the battery is dead for a portable information communication equipment, the consumption status of the battery shall be confirmed by voice, in addition to display.

Example 3 When a character is mistakenly input into the input field which accepts only a numeric value, it gives not only a beep but information which is recognized even by persons with auditory disabilities.

Example 4 When a warning message is displayed on a screen, it gives information which is understood even by persons with visual disabilities.

Information : The status that equipment is not ready means the following: the power supply is not switched on or another action is current and a new action cannot be accepted.

Remarks : The provisions for failure of equipment shall be in accordance with 5.1.8.

5.1.7 Start-up, shutdown and restart of system Consider so that the start-up and shutdown are capable of being operated by users themselves.

Information : The start-up and shutdown may not be capable of being operated physically by users themselves.

Example 1 Consider location, size, shape etc. of a power supply switch.

Example 2 A remote switch and other alternative means can be used.

5.1.8 Operation at time of failure Consider so that the forced shutdown and restart are capable of being operated by users themselves when failure occurs.

Information : If occurrence of failure is assumed by users, then, the forced shut-down and restart should be capable of being operated easily by users themselves. In that case, equipment should not be affected adversely, and it should be capable of returning to the status before occurrence of failure.

5.2 Vocabulary and notation

5.2.1 Use of general vocabulary and notation Technical terms, words of foreign origin and abbreviations shall not be used abundantly. Intelligible expression should be used.

Remarks 1 When technical terms, words of foreign origin and abbreviations are used, a glossary should be prepared, or other considerations should be given to help users understand operation.

2 The notation and manual of equipment should be easily and correctly understood so that users can use equipment effectively.

5.3 Independence

5.3.1 Guarantee of independence of operation information and data The guarantee of independence of operation information and data shall be as follows:

a) OS shall not rewrite information on display and setting which users set for the purpose of information accessibility, without users' permission.

Information : If OS or an application changes information accessibility function and setting which OS presented, without informing users of such changes, users may make mistakes in subsequent operation. Operation may become impossible, and the related persons may be given inconvenience.

Example 1 Suppose that persons with auditory disabilities do not use voice output and have switched it off. If it is switched on automatically, this is not known to users, and the related persons may be given inconvenience.

Example 2 Suppose that persons with auditory disabilities have increased sound volume to hear better. If the volume is decreased automatically, the voice may not be noticed.

Example 3 Suppose that persons with colour sense disabilities have changed the colour scheme. If the setting is changed automatically, difference may not be distinguished, or a mistake in reading may occur.

Example 4 Suppose that users with visual disabilities are using a screen reader. If the voice is switched off automatically, users cannot know what has happened.

b) An application should not rewrite information on display and setting which users set through OS for the purpose of information accessibility, without users' permission.

Remarks : It is likely that intentional or accidental rewriting by other users cannot be prevented. Even when rewriting occurs, it is desirable to be able

to return easily to the original status.

5.3.2 Guarantee of independence between applications The guarantee of independence between applications shall be as follows:

a) When an information accessibility function is effective in a certain application, it shall not be interrupted by other applications or it shall not be invalidated.

Information : It is likely that when an application has its own information accessibility function, this application changes or interrupts the colour scheme, sound volume, etc. which were already set to be suitable to users.

b) When an application attempts to change the setting of information accessibility function, the application shall demand confirmation of change, and change after user's permission. After application is finished, it shall return the setting to the original setting.

Information : When application attempts to change by all means, it shall return the setting to the original setting on its completion, thereby, it does not affect other applications.

5.3.3 Requirements for change of design/development specifications Upgrade or update shall not damage the information accessibility functions that have already been offered.

Information : To learn new wethod is difficult for older persons, and the partial change of operating procedure induces confusion with the procedure before change, and often causes an operational error. Furthermore, when the range in which hands can move is limited due to the severe limb disability or the operation is performed by one switch and one button using functions other than hands, the change of operating procedure induces confusion with the procedure before change, and often causes an operational error.

Information : The multi-media function and other advanced functions that are newly offered may lower the level of information accessibility functions that have already been offered.

5.4 Connectivity

5.4.1 Interface specification and protocol For the interface specification and protocol, see the following:

a) The hardware and software of alternative input and output equipment to be connected externally should disclose the external connection interface specification of the information communication equipment to which it is to be connected.

Remarks : In order to design and develop an alternative keyboard, an alternative pointing device, various switches, a braille printer, etc., it is indispensable to disclose the hardware specification and software specification of the external connection function. For this purpose, developers of information accessibility of information processing equipment and its peripheral devices should disclose the hardware specification of infor-

mation processing equipment itself and peripheral devices, etc. as well as the software specification including OS.

b) The hardware and software of alternative input/output equipment connected externally should use the interface specification used widely among makers. However, if the interface specification of alternative input/output equipment connected externally is intended to be widely used among makers in future, this rule does not apply.

Information : If the interface specification of alternative input/output equipment connected externally such as an alternative keyboard, an alternative pointing device, various switches, a braille printer is now widely used among makers, that alternative input/output equipment can be connected to other main body system of identical purpose. Thus, a range of user's selection of equipment will widen.

Remarks : Rather than the wired connection, the wireless connection is preferable. However, it is necessary to consider the effect on human bodies, such as a pacemaker.

5.4.2 Location of entry ports of external optional equipment Those ports that are frequently engaged and disengaged should be easy to engage and disengage, considering the following matters:

Example 1 When the terminal requires frequent change of connection, consider so that its location and shape are such that insertion is easy, and mistake of input is prevented.

Example 2 In order to insert/remove the electronic media in the correct direction, consider the location of entry ports of electronic media and the inserting method.

Example 3 In order to ensure the correct and easy connection of connectors, consider location, colour scheme and contrast, and shape.

Information : Users with reduced muscular strength, paralysis, tremor and involuntary movement of hands, reduced muscular strength due to aging may find it difficult to change the electronic media and connect peripheral devices. Furthermore, users with reduced vision due to visual disabilities or aging may find it difficult to identify their location or direction of attachment and detachment.

5.5 Physical safety

5.5.1 Confirmation of safety Consider so that the operation of equipment which has an adverse effect on safety and health of a user due to the unprepared motion of a user does not occur. Depending on the case, consider so that a product and a system may be safely suspended, or a warning shall be given to prevent a user from getting confused and perplexed.

Example 1 When persons with visual disabilities are operating using the sound information with the headphone, the sudden addition of sound with unexpected power shall not cause auditory disabilities.

Example 2 When buzzer sound or voice information output is produced, a part of screen shall blink. When error message or other information is displayed on the screen, sound or voice shall be produced to inform the situation.

Example 3 In order to cope with users with both visual and auditory disabilities, equipment shall need the function to present information by vibration or other tactile sense.

Example 4 When it is predicted that a user performs a dangerous work accidentally, the predicted danger shall be made known to a user with more than one means.

Information : When persons with visual disabilities require operation by touch, if caution/warning for operation is presented beforehand by the means which users can recognize, users can avoid danger at the time of operation.

Information : These functions also help users with intellectual disabilities.

5.5.2 Prevention of photosensible epilepsy, etc. When blinking a picture, light, etc., consider the blinking condition so that photosensible epilepsy, etc. is not induced.

Information : The blinking light may induce photosensitive seizure (photosensible epilepsy). The peak is time frequency of 20 Hz. Alternative blinking of red and blue is most likely to induce the epilepsy. Since it is related with a user's safety, the maximum consideration is required.

5.5.3 Consideration on allergy Consider so that the use of material which may cause allergy is avoided.

5.6 Requirements for security

5.6.1 Information leak Equipment shall offer accessible operation methods which ensure information security when the information processing equipment and its peripheral devices dealing with information which shall not be leaked are used.

Information : If voice output or image enlargement is performed without considering information security, then, there is a possibility that the third party steals password, personal information and other important information.

5.6.2 Alternative means for user's identification means When biometrics is used to identify users or to authorize use of equipment, selection of an alternative identification means shall be possible, and such means shall not rely on user's physical characteristics.

Information : When authentication is performed by fingerprint, iris, face, etc., an alternative method shall be prepared; for example, input of password, etc. by a numeric pad.

Example : It is necessary to consider that there are users who cannot use fingerprint authentication due to disabilities of hands caused by an accident, etc.

5.7 Requirements for personal information

5.7.1 Prevention of information leak due to alternative means Even when an alternative means is used, consider so that information on privacy may not be known by the third party.

Example 1 In the case of voice output, consider so that the produced voice may be displayed and the stop of voice output can be selected.

Information : In the case of users with auditory disabilities, they may not notice that the voice output is carried out.

Example 2 When the information processing equipment and its peripheral devices, etc., are used for the input of personal information, consider so that neither screen display nor input operation may be peeped at.

Example 3 When an earphone and a headphone are attached, the output from the loudspeaker of main body shall be stopped.

5.7.2 Appropriate warning to users When a problem may arise in the protection of information on privacy, it is desirable to inform a user with adequate means before input operation.

Information : Warning shall be presented before input operation. Equipment shall present selection means as to which alternative means are needed by users. Appropriate warning shall be presented to any problems to basic input means and problems when alternative means are not selected.

Information : Users must correctly recognize the privacy problems that arise at the input operation of the information processing equipment and its peripheral devices. This is important for protection of privacy. Some users are beginners and others are frequent users; though it might be unnecessary for frequent users, for beginners, appropriate warning is very effective.

5.8 Requirements for content protection means

5.8.1 Right of use Even when data are protected, for example, by reason of copyright etc., data shall be available by some means or other to users who have the right to use the data.

Information : Users with visual disabilities sometimes want to read the text displayed on the screen in braille output and the voice output. For that purpose, text data are necessary.

Information : The present copyright law allows to convert the open publications into electronic braille files for braille output and disclose them. (2000 Revised Copyright Law, Article 37: Open publications are allowed to be reproduced in braille. Open publications are allowed to be recorded on the recording media or publicly communicated, by processing braille with a computer.)

Information : The Agency of Cultural Affairs recommends that when copyright owners permit free use of their copyright, they attach the mark,

"Disabled person O.K.". The mark can be freely downloaded from the web page of Agency of Cultural Affairs.

5.9 Requirements for environment

5.9.1 Consideration to surroundings Where there are acoustic output, vibration output, blinking screen etc., their performance shall be recognized by users with disabilities and shall not affect surroundings adversely. Therefore, their output level and degree shall be adjustable.

Information: Users with auditory disabilities cannot notice loud alarm sound coming from the equipment which disturbs the neighboring persons. The blinking screen does not inconvenience users with visual disabilities, but it may distract the neighboring persons. Vibration should be suppressed so that it does not affect the surrounding adversely. Vibration should be noticeable to persons with these disabilities and it should be adjustable so that it does not affect the surroundings adversely.

5.10 Requirements for supporter

5.10.1 Consideration to supporter Consideration should be given to supporters who use equipment together with persons with disabilities when equipment is designed.

Information : Supporters sometimes operate equipment and work with persons with disabilities. Supporters teach operation method, or help when users cannot process, such as error and hang-up. In this case, it is desirable that users can use the setting of assistive technology and equipment which is suitable to them, while supporters can operate under the normal setting.

Example 1 While the user is using the screen magnification function, the supporter wants to operate by seeing the entire screen in the usual screen. In this case, one-touch operation for mutual switching should be used, instead of opening the setting screen each time for switching.

Example 2 When the user has set key input parameters and repetitive input parameters, the supporter wants to input by the usual key timing. One-touch operation for mutual switching should be used, instead of opening the setting screen each time for switching.

Example 3 While the user is operating the onscreen keyboard with one switch by auto scan mode, the supporter wants to use the usual keyboard and mouse and operate the onscreen keyboard by manual scan mode. Consider so that both operations can be performed from either side at the same time.

5.11 Requirements for consideration on daily continuous use It is desirable that the work necessary for continuous use by users is able to be performed by users themselves.

Example : Charge of a battery, exchange of a cell, supply of paper, exchange of ink and a toner cartridge, etc.

6 Requirements for input/output system

6.1 Visual information (output)

6.1.1 Location and layout For the location and layout see the following:

a) Text and controls (a radio button, an editing box, a list box, etc.) shall be arranged in consideration of reading sequence such as tab order, assistive technology.

Information : When assistive technologies such as the screen readers are used, even though the layout on the screen is appropriately arranged visually, it may differ sometimes from the user's receiving sequence.

b) The design of operation and command should be consistent.

Information : If the operation does not deviate greatly from the familiar operation once obtained by learning, the operation can be easily performed by guessing without relying on recognition or memory.

Information : When a task model (model which a user pictures to himself or herself) is a fresh operation model which differs from a conventional interface greatly, a significant improvement of operationality may be obtained even if consistency with a conventional operation is not maintained.

Information : For the consistency, there are consistency in application and consistency as the whole equipment.

Information : For the consistency at the menu dialog or command dialog, the relevant provisions extracted from JIS Z 8524 and JIS Z 8525 are given in annex 3 (informative).

6.1.2 Colour and contrast The colour and contrast shall be as follows:

a) Information on the screen shall be presented with adjustable brightness and contrast to ensure that it is easy to see.

Remarks : The numerical value shall be in accordance with JIS Z 8513. However, the flat panel shall be in accordance with ISO 13406-2.

b) All the information conveyed with colour shall be available even in the environment where that colour cannot be reproduced or perceived.

Remarks 1 The colour scheme shall be in accordance with JIS Z 8518. However, the flat panel shall be in accordance with ISO 13406-2.

2 Remember that the identification means by colour scheme is the second best for persons with colour sense disabilities (see JIS Z 8518).

c) Colour scheme for foreground and background shall give sufficient contrast.

Remarks : The brightness and contrast shall be in accordance with JIS Z 8513. However, the flat panel shall be in accordance with ISO 13406-2.

Information : [common to a) to c)] Because of heredity, low visual acuity due to aging, change of colour sense due to stain of crystal lens etc., users' colour sense is diverse. The background, characters, buttons,

icons etc which are indicated in the display are hardly identifiable depending on colour scheme. The screen information is recognized mistakenly, and the visual efficiency becomes low.

6.1.3 Enlargement and reduction of display Enlargement and reduction of the size of screen information shall be possible to make it easy to see.

Remarks : Because of low visual acuity due to amblyopia, aging, etc, there are cases where characters, buttons, icons, etc. indicated in a display are too small and difficult to see. Because of narrow field of vision, there are cases where image information cannot be seen at a single glance and image information is recognized mistakenly, and efficiency of entire image lowers. For this reason, the function to enlarge/reduce all image information with the magnification ratio which is easy to see is needed. However, since visual disabilities are diverse, it is desirable for an implementer to adequately consider based on the application and content whether it is only temporarily enlarged, whether it is always enlarged, to what extent it is enlarged, how to deal with the portion covered by enlargement, and so on.

Example 1 The area to be enlarged/reduced shall be the area which is designated by a user with a cursor moving key, a mouse etc. when necessary. In addition, movement of a pointer or a cursor shall be traced. By doing this, the area which should be operated/selected at the time of menu selection and text creation is difficult to miss.

Example 2 The enlarged display makes it difficult to understand the entire layout. So, when the enlarged display is carried out, attach the function which can return the display to the original display magnification.

6.1.4 Graphic and picture image When graphic or image is used, an alternative text shall be offered.

Information : If information is displayed only by image or picture, there may be cases where persons may be unable to understand the content due to visual disabilities, etc. even if a screen reader is used.

6.2 Sense and auditory information (output)

6.2.1 Loudness and frequency For the loudness and frequency, see the following:

a) Loudness shall be changeable.

Remarks : Loudness should be changeable in a range as wide as possible.

b) Loudness should be changeable for each frequency band.

c) The alarm sound should not be composed of a single frequency but frequencies at plural pitches. Simultaneous or alternative output is desirable (see JIS S 0013).

Information : [common to a) to c)] When sound volume of voice information is too small, or a pitch is too high or too low, there is a possibility that persons with auditory disabilities cannot acquire information.

6.2.2 Speed Speed control, interruption, resumption, etc. shall be possible.

Information : In the case of users with auditory disabilities or users with learning disabilities, etc., if audio playback speed is made slow or paused in an adequate place, content may be easy to understand. After content is understood by interruption, if resumption is carried out, the content will be easy to understand. Persons who can acquire information only through voice may prefer fast playback.

6.2.3 Display of acoustic status The important acoustic output information shall be offered also with means other than auditory means.

Remarks : Like a beep, when offering the important information using sound, it is necessary to use methods other than sound so that the information may be correctly conveyed to also persons with auditory disabilities. For example, it is required to change information into blinking of the whole display screen, or to change the offered content into characters or graphics.

6.2.4 Readiness of external output terminal It is desirable to prepare the external output terminal for connecting an earphone and a headphone.

Information : The external output terminal which can connect an earphone or a headphone is prepared so that users may obtain sufficient sound volume or surrounding persons may not hear the voice.

Information : When it connects, it is desirable that the function which stops the output from a loudspeaker of main body may be prepared and that it may be chosen.

6.3 Animation and sound information (output)

6.3.1 Presentation of alternative information on animation and sound For the presentation of alternative information on animation and sound, see the following:

a) For the animation information, voice also shall be presented.

Information : If the information is presented only with the picture, the content may be unable to be acquired for the persons with visual disabilities or in the situation where its screen is unable to be seen.

b) For the sound information, text also shall be presented.

Information : If the information is presented only with the sound, the content may be unable to be understood in the situation where the information is difficult to hear due to auditory disabilities, or under the noisy environment.

c) The sound as the alternative information in a) described above and the text as the alternative information in b) described above should be presented by being synchronized with the animation and sound.

d) The alternative information on the text which explains the content in place of the animation and sound information shall be presented.

Information : [common to a) to d)] Such consideration is effective also for the user who has a certain disability with regard to memory and cognition.

6.3.2 Reproduction of animation and sound Equipment and software shall be capable of reproducing the information given in 6.3.1 a), b), and c) when animation and sound are reproduced.

6.4 Key and button (input)

6.4.1 Ergonomics requirements for key The ergonomics requirements for key shall be in accordance with JIS Z 8514.

Remarks 1 In design of a key, appropriate ergonomics consideration is given. The scope of JIS Z 8514 is limited to the stationary separate-type linear keyboard, and does not include keyboard and buttons for note book personal computers, but the conditions shall be agreed as much as possible.

2 Also in the case of keyboards outside the scope of JIS Z 8514, the requirements in JIS Z 8514 should be applied.

6.4.2 Operationality (suitable force, etc.) The operationality (suitable force, etc.) shall be as follows:

a) Consider so that the operation of a key, a button, and a switch can be performed with a suitable force.

b) The stroke of a key, a button, and a switch shall be ensured so that pressing is easy.

Information : [common to a) to b)] When the pressing force of a key, a button, and a switch or stroke (displacement of a key) is too large, users with reduced muscular force bear an excessive burden. On the contrary, when the pressing force or stroke is too small, users with tremor and involuntary movement of hands may mistake in input.

6.4.3 Layout (spacing, learning, left/right difference, change, etc.) For the layout (spacing, learning, left/right difference, change, etc.) shall be as following:

a) Consider so that the location and shape of a key, a button, and a switch are designed to facilitate the recognition of function, operating and prevention of error of entry.

Remarks : To confirm the position correctly, colour scheme, contrast, shape and tactile sense shall be considered.

Information : Deterioration of visual acuity due to visual disabilities and aging, and slowdown of cutaneous sensation may cause difficulty in identifying their positions and functions.

Information : The reduced muscular force and paralysis, the tremor and involuntary movement of hands, the reduced muscular force due to aging may cause difficulty in pressing main keys or switches (including a power supply switch, a reset switch, etc.).

b) It is desirable for a user to be able to change the allocation of function assigned to a key, a button, and a switch.

Remarks : When a key, a button, and a switch have marks (a label, a stamp, etc.), it is desirable for the marks to be able to be changed.

Example : When only a right hand can be used, the function of the escape key arranged at the upper left side is assigned to one of keys with low frequency in use arranged on the right side.

6.4.4 Setting up function of definite conditions of key, button and switch imput The system shall enable users to customize the delay after pressing a key, a button, and a switch until a key, a button and a switch press are received.

Information : Because of the tremor and involuntary movement etc. of hands, users may touch a key other than the key which users want to press, and may mistake input. Because of the reduced muscular force, users cannot continue to press a key longer than a certain time. Even when they touch a key which they want to press, the key input may not become definite.

6.4.5 Prevention of double push Suppose that after a key, a button, and a switch are pressed, the same key, button, and switch are pressed again. If the time interval is shorter than the preset interval, the second input shall be overridden.

Information : Some users cannot release a pressed key with appropriate timing, and touch the same key again. The unintended input like this often occurs within a very short time interval.

6.4.6 Setting up function of repeat input conditions The system shall enable a user to set up repeat input condition when a key continues to be pressed down.

Remarks 1 Repeat input conditions are as follows:

— Active or inactive of repeat input

— Time until the start of repeat input

— Interval of repeat input (repeat ratio)

2 In some cases, users want character keys to be inactive for repeat input, while they want arrow keys to be active for repeat input. It is desirable to select active or inactive independently for any key.

Information : Because of the reduced muscular force, tension, aging etc. some users cannot release a pressed key with appropriate timing. The repeat input function of key may produce the input of unintended key and the mistake of input.

6.4.7 Sequential input function Instead of simultaneous entry of more than one keys/buttons, the system shall provide the function for sequential entry where key/button is entered one by one.

Information : In order to use function, there are operations of pushing more than one keys/buttons simultaneously such as entry of keys while holdings down the shift key (simultaneous keying operation). However, because of deficiency of limbs or hands, fingers, the reduced muscular force or paralysis, tremor or involuntary move-

ment of hands, some users can use only a single finger, a foot, a stick in the mouth etc. and press keys one by one. There may be a case where simultaneous keying operation is impossible.

6.4.8 Status display The status of a key, a button, and a switch with the function which changes to two or more states by operation shall be able to be confirmed.

Remarks 1 [CapsLock], [NumLock] and other keys whose status alternates whenever it is pressed shall inform users by some means of the present status.

Example : By changing the kind of sound etc., the present ON/OFF status shall be identified.

2 Generally, it is displayed on the screen using icons etc., or main body of equipment is provided with a lamp. In addition to that, for persons with visual disabilities, presentation with voice is necessary.

Example : The function by which the sound, voice etc. can be fed back at the time of a key input defined shall be provided.

6.4.9 Marking tactile dots When many keys/buttons/switches are arranged adjacently on a keyboard, marking tactile dots shall be placed on keys/buttons/switches of clue, in order to help identification of location of each key/button/switch.

Remarks : Even when it is difficult to see a key, a button, and a switch, in order to place hands securely on the constant positions of keyboard, specific keys (for example, F and J for character key, 5 for keypad, 5 and 9 for function key) shall have tactile dots, or shall be provided with a seal on which convex/concave braille/symbol is printed.

Information : See JIS S 0011.

6.4.10 Colour scheme The colour scheme shall be as follows:

a) The colour scheme of a key and a button shall be in accordance with 6.1.2 b).

b) Characters and symbols displayed on a key, a button, and a switch shall be considered with regard to type face, size, thickness, contrast, etc.

Information : Because of deterioration of visual acuity due to visual disabilities and aging, some users can hardly see the colour scheme of background and characters, etc. displayed on a key, a button, and a switch, and mistake information.

6.4.11 Input focus The input focus shall be as follows:

a) The location of an input focus shall be maintained.

Remarks : Suppose that a user operates at a certain window, moves to another window, and returns to the first window to operate. In this case, the position of the latest input at the first window shall be retained and offered.

Information : If this is not possible, users have to perform plural keystrokes whenever they switch windows.

b) An input focus shall be easily identifiable visually, and even when assistive tech-

nology such as a screen reader, etc. is used.

Remarks : [common to a) and b)] Consideration shall be given to ease to see and consistency.

Information : [common to a) and b)] Among information obtained by a user from the screen, information of where an input focus is positioned is one of the most important information. If this is not conveyed to a user smoothly, a user feels excessively stressed.

Information : [common to a) and b)] Because of deterioration of visual acuity due to visual disabilities and aging, some users can hardly find an input part as shown by surrounding with a thin line or drawing an underline.

6.4.12 Operation by keyboard The operation by a keyboard shall be as follows:

a) The function which can perform all operation/selection of software only with particular keys on a keyboard or its combination shall be offered.

Example : Menu selection by ALT (alt) key and character key, moving between selected buttons by TAB (tab) key, printing function by simultaneous keying of CTRL (control) key and the "P" key, etc. are examples.

Information : Because of the reduced muscular force and paralysis, tremor and involuntary movement of hands, a mouse cannot be operated. Because of visual disabilities, a mouse pointer is not seen. In such cases, software operation/selection must be performed by a keyboard.

b) Movement on a keyboard shall be made to be performed in order of the input which a system intends.

Remarks 1 When developing software and adding an original function, consider so that it may not overlap with a specific combination.

2 [common to a) and b)] It is necessary to consider a position, a colour scheme, contrast, form, tactile feeling, etc. so that a position can be confirmed correctly.

3 [common to a) and b)] Consider also the consistency of operation.

6.4.13 Feedback function For the feedback function, see the following:

a) When there is input of keys, buttons, and switches, equipment shall have the function to notify it by voice or screen display, irrespective of display on screen.

Remarks : Equipment shall have the function to feedback by sound, voice or screen display, etc. when key, button and switch input are definite.

Information : There may be cases where users with paralysis and decline of fingertip sense cannot know from their sense whether the key, button and switch input were performed or not, or users with visual disabilities cannot know the key, button and switch positions, key repeat, and whether the key, button and switch input become definite.

b) It is desirable that a user can feel that operation was accepted by feedback of snap action, etc.

6.4.14 Preparation of alternative means Alternative means such as on-screen keyboard shall be offered.

Remarks 1 Users with the reduced muscular force and paralysis, tremor and involuntary movement, etc. of hands can hardly perform the input operation by the standard keyboard. In this case, equipment shall have an alternative keyboard which has the function equivalent to that of the standard keyboard.

Example 1 When users with tremor and involuntary movement of hands cannot perform delicate key operation, a large keyboard is effective.

Example 2 When users with the reduced muscular force and paralysis have the limited range of movement of hands, a small keyboard is effective. These alternative keyboards require each function of 6.4.1 to 6.4.13. At the same time, they require functions which can change the size/arrangement of keys, according to the body site (elbow, toe, etc.) to be used for input.

Example 3 In addition to keyboards of keying type, other alternative keyboards, such as an optical input keyboard using laser beam for input, a coded (Morse code) keyboard are also effective.

Remarks 2 Persons with severe limb disabilities, etc. have the limited range of movement of hands and can hardly input by a physical keyboard. In such a case, they require an onscreen keyboard in which a keyboard is displayed in the display and characters and symbols can be selected and inputted by ON/OFF operation, etc. by a pointing device or a switch. These have functions to change size/arrangement of keys, to switch input methods (direct selection, scan input method, etc.), to temporarily delete or escape onscreen keyboard. Furthermore, when a pointer stays on a key for the longer time than the predetermined time, the key is automatically selected.

Information : A switch, which is prepared apart from a keyboard, is for effectively utilizing the part which can be operated at the discretion of a person. For example, there are an expiration switch operated by expiration, a push button micro-switch operated by slight motion of the body, a large-sized switch operated by a palm, a head, etc.

6.4.15 Connection of plural devices At least two keyboards should be connected to enable users to operate by either of them.

Remarks : Even when the special keyboard is offered according to the user, the original keyboard should be retained as it is so that it can be used.

Information : When a care worker supports input operation, etc., the care worker cannot efficiently operate by the special keyboard which was customized to the user.

6.5 Pointing device (input)

6.5.1 Ergonomics requirements for pointing device Design (ergonomics viewpoint) of a pointing device shall be in accordance with ISO 9241-9.

Remarks : In design of a pointing device, appropriate ergonomics consideration shall be given.

6.5.2 Moving speed/acceleration of pointer Customization of the characteristics of moving speed and acceleration shall be possible.

Remarks : Equipment requires the function which can adjust the ratio between the pointing device movement stroke and the pointer movement stroke, so that such an adjustment is possible that when a user moves a pointing device too much, a pointer does not move so much, or when a user moves a pointing device little, a pointer moves enough.

Information : Users with tremor and involuntary movement of hands have difficulty in delicate control of pointing device. Users with the reduced muscular force and the limited range of movement of hands can hardly move a pointing device enough.

6.5.3 Reception delay of pointing device The time from the button press down of pointing device until the reception of button movement shall be set up by a user.

Remarks 1 The time from the button press down of pointing device until the reception of button movement shall not depend on the criteria of a user's physical strength which the desigher has assumed, but it shall be set up by users themselves.

2 When pushing a button, a mouse may be moved due to tremor of hands, etc.

6.5.4 Area covered by pointer Customization of the area covered shall be made possible.

Remarks 1 Depending on the scene of application, the moving area of a pointer should be contrived to be limited to a constant area.

2 This function shall be able to be set/released as necessary.

Information : Users with tremor and involuntary movement of hands have difficulty in delicate control of pointing device. Users with the reduced muscular force and the limited range of movement of hands can hardly move a pointing device enough.

6.5.5 Pointer on a screen Pointer on a screen shall be as follows:

a) Follow 6.1.2.

b) The size of pointer and cursor, change of shape and colour, display of tracing, blinking intervals, etc. and other conditions shall be able to be set up.

Information : Users with low visual acuity due to amblyopia or aging, or colour sense disabilities can hardly find a small pointer or a pointer whose colour is similar to background. They can hardly find where a pointer is located. Especially in the case of high-defini-

tion display, a pointer tends to be smaller and difficult to find. For this reason, changing the size and colour is effective.

6.5.6 Hold of button Button hold shall be made possible by a single button press.

Information : Some users find it difficult, by physical limitation, to carry out a pointing operation while pushing a button.

Example 1 When a button is kept pressed longer than the predetermined time, the button is judged to remain pressed, or plural buttons are provided, and either button shall have such function.

Example 2 To release a hold, a button is pressed again, or a pointing operation is stopped for the predetermined time, and a hold will be released automatically.

6.5.7 Setup of button click interval When the continuous clicks (double click, etc.) operation is required, the click interval shall be changeable.

Information : Users with the reduced muscular force and paralysis, tremor and involuntary movement of a hand find it difficult to perform a click operation continuously. Such users can perform a secure operation if it is a slow operation which is suitable for them.

6.5.8 Setting up function of button press definite conditions Users shall be able to set up the time from pressing the button of pointer until the button input is accepted.

Information : Users with the reduced muscular force and paralysis, tremor and involuntary movement of a hand encounter that pressing down of a button is not stable. Chattering of a key will occur, or it will become double press.

6.5.9 Assignment of function to button (including double click by single click) Double click and drag of buttons of a pointing device are the functions which are peculiar to a pointing device. Such functions shall be assigned to each button so that the functions can be realized by a single click alone.

Example 1 Each button shall have the function to treat one press down of a button as double click. Each button shall also have the function to judge that the button remains pressed for drag after the first press even when it is not, and to judge that the button is released by the second press.

Example 2 Separate independent buttons shall have the respective functions.

Information : For some users, a double click and a drag operation may be difficult.

6.5.10 Feedback function The feedback function shall be as follows:

a) A feedback function to users for a pointing operation shall be provided.

Remarks : Acceptance of input shall be indicated by click sound, voice, icons etc.

Information : When some users push a button, the sense may not return through the nerve of fingers. This is easy to understand, if operation with gloves on is supposed.

Information : It is important that the button hold offered by 6.5.6 also has feedback.

b) It is desirable that there is a mechanism which prepares plural feedback functions and in which users are informed through more than one sense organs.

6.5.11 Preparation of alternative means A keyboard or other means which are alternative to a pointing device shall be is offered.

Remarks : For users who cannot perform a mouse operation in which a hand and an arm must be moved over a long distance, but can perform a key operation, specific keys on a keyboard, keypad, etc. shall be used to perform operations of pointer movement, click, double click, drag, etc.

Information : When users with the reduced muscular force and paralysis, tremor and involuntary movement etc. of a hand cannot perform operation of a pointing device such as a mouse, an alternative means is required.

6.5.12 Connection of several devices It is desirable to connect at least two pointing devices simultaneously, and to be able to operate with either of them.

Remarks 1 Even when assistive technology is connected, the function of a standard mouse should be retained as it is.

2 When the different parts of human body are used for operating the function of the pointing of a pointing device, and the function of a button, respectively, two pointing devices may be required.

Information : This item is related to 5.10.1. When users use the dedicated assistive technology, if operation is possible only with the assistive technology, the assistance by the supporter may become difficult.

6.6 Cognitive/intellectual ability and memory (input and output)

6.6.1 Operation relying on memory Memory of past operation procedure or screen content should not be used as prerequisite for a new operation.

Example : When such an operation is required, the past operating procedure shall be displayed, or the screen content presented again.

Information : Generally, memory is not accurate. Especially when cognitive ability is low due to aging, etc., it is much more difficult to recall correctly the operating procedure performed in the past or the screen content seen in the past.

6.7 Language (input/output)

6.7.1 Connection guarantee of alternative means Some users with sensory and cognitive disabilities, or with language and reading and writing disabilities use sign language and braille or different language and expression means. In order to assist more people including those users, equipment shall connect to software and devices which permit various conversion and expression related to language.

Remarks 1 For users with visual disabilities, voice output is often used as an alternative means. Not only that, the same content shall be converted into braille and outputted to pin display.

2 For users with auditory disabilities, a presentation of a sign language image is also effective.

3 For users with multiple visual and auditory disabilities, a presentation by the finger braille device is also effective.

6.7.2 Display The display shall be as follows:

a) Display character size The size of character shall be changeable by users.

b) Display font The font of character should be changeable by users.

Information : [common to a) and b)] Because of low visual acuity due to amblyopia, aging, etc, there are cases where characters, buttons, icons etc. indicated in the display are too small and difficult to see. Because of narrow field of vision, there are cases where image information cannot be seen at a single glance and image information is recognized mistakenly, and efficiency of viewing the entire image lowers. For this reason, if the font and size of characters displayed are freely changeable, it is effective.

c) Text display The line spacing and character spacing shall be freely changeable.

Information : Because of low visual acuity due to amblyopia, aging, etc, there are cases where characters, buttons, icons etc. indicated in the display are too small and difficult to see. Because of narrow field of vision, there are cases where image information cannot be seen at a single glance and image information is recognized mistakenly, and efficiency of viewing the entire image lowers. Furthermore, users with learning disabilities are affected by the lines and characters nearby and cannot read what they want to read. For this reason, it is convenient if image information can be freely changed/displayed to the format in which the line spacing and the character spacing are legible

d) Chinese character conversion It is desirable to prepare the conversion function with less procedures and adapting to users, and the explanation function of converted Chinese character.

Remarks 1 Equipment requires the function in which the frequently used words and expression sentences are registered beforehand, and that the previously input Chinese characters are automatically displayed/selected as the input candidates.

Information : Users with the reduced muscular force and paralysis, tremor and involuntary movement of a hand find it difficult to perform input operation with a keyboard. Users with visual disabilities have a low ability to see a key. In those cases, the input efficiency with a keyboard lowers.

2 In order to differentiate homonyms, equipment requires the function to offer complementary information as to what Chinese characters are selected.

Information : This function is offered by assistive technology such as a screen reader.

6.7.3 Title When visual information other than text is used, equipment requires the function to display the closed caption.

Remarks : Users with visual and cognitive disabilities may find it difficult to understand the screen content. For this reason, equipment requires the function that the title to explain the screen content is given in the format which can be converted into voice and braille.

6.7.4 Consideration to cognitive ability, etc. The consideration to cognitive ability, etc. shall be as follows:

a) Pronouncing Depending on a user's cognitive ability, it is desirable to attach Japanese phonetic characters to difficult Chinese characters (name of a person, name of a place, etc.).

Information : Users with low cognitive ability or users whose mother tongue is not Japanese may find it difficult to read Chinese characters. Furthermore, users with low visual ability require acquiring information after information is converted to voice or braille. They require reading information such as Japanese phonetic characters attached to Chinese characters.

b) Offering of summarized text When text is long and complex, summarized text should be prepared.

Information : Users with low cognitive ability may find it difficult to understand long sentences and complex text. It is necessary to offer the text consisting of sentences which are summarized intelligibly and briefly. Furthermore, when persons with low visual ability obtain information through conversion to voice and braille, if the summarized sentences are offered in a text, they can reach necessary information efficiently.

c) Prediction of input Equipment should provide the function that the content of sentences to be inputted next can be forecast, and that the amount and procedures of input are reduced.

Information : Users with the reduced muscular force and paralysis, tremor and involuntary movement of a hand find it difficult to perform operation with a keyboard. Users with visual disabilities have low ability to see a keyboard. In those cases, input of sentences using a keyboard is of low efficiency. For this reason, equipment requires the function that the frequently used words and expression sentences are registered beforehand, and that the previously input character strings are automatically displayed/selected as the input candidates.

6.7.5 Voice-recognition The voice input/output shall be as follows:

a) Voice-recognition The voice-recognition of synthesized voice shall be changed/se-

lected by users in terms of pronunciation speed, sound volume, sound quality (male voice, female voice etc.).

Remarks : Because of visual disabilities or a long distance at the bedside from the display, the display may be difficult to see. For this reason, equipment requires the function that the character information in any position of screen is read aloud in order to efficiently understand the content of document and e-mail. Furthermore, equipment requires the function of speed adjustment, skip (reading skip), interruption of reading aloud, etc.

b) Read-out Read-out shall be performed simultaneously with other input devices.

Information : Wrong voice-recognition may be caused by the surrounding noise or a user's wrong pronunciation. When the voice is used again to correct the wrong input, the same error may occur. Therefore, it is necessary to correct an error from a keyboard which can be used simultaneously with voice-recognition, or from different input devices.

6.7.6 Braille and finger Braille The braille and finger braille shall be as follows:

a) Braille input Braille must be able to input by concurrent combination keying of six keys on a keyboard.

Remarks 1 Software may be used to treat a standard keyboard as a braille keyboard. In that case, the standard keyboard requires the function that it can simultaneously accept six or eight key inputs which were keyed in simultaneously.

2 For six point braille, six keys, F, D, S, J, K, and L, are often used. The function of acceptance of these simultaneous keying is required at minimum.

3 It is more desirable to have the function that seven points including a space key can be accepted.

b) Braille output It is necessary to prepare the coding system which is widely used by persons with visual disabilities.

Remarks : For persons with visual disabilities, it is necessary to prepare braille display which displays braille data by raising and lowering six or eight pins corresponding to braille, and braille code system corresponding to tactile display which indicates graphic or line drawing as convex/concave information as it is.

c) Finger braille input and output In order to facilitate reading by persons with multiple visual and auditory disabilities, the keying interval of finger braille of sequential input must be measured and saved, and they should be processed in real time. Furthermore, the presentation time of the finger braille presented sequentially should be controlled individually and arbitrarily.

Remarks : For persons with multiple visual and auditory disabilities who have no communication means other than tactile sense, the finger braille is one

of a few means which are available at present. In order to enable those persons to use it, the keying interval of finger braille of sequential input must be, with resolution of 10 ms or better, measured, saved, and processed in real time. Furthermore, the presentation time of the finger braille presented sequentially must be, with resolution of 10 ms or better, controlled individually and arbitrarily.

Example 1 By combining with a finger braille input means, it can be used as a means of communication like a telephone.

Example 2 Like a text voice synthesizer, the structure of a text finger braille output device is possible. Various kinds of output systems which are similar to a text voice synthesizer are possible. Various applications are possible as the information acquisition means for persons with multiple visual and auditory disabilities.

Information : Users with multiple visual and auditory disabilities cannot but depend on the touch, in order to receive information. Tactile means include the following: touch sign language to touch and read sign language; touch finger character (which is mainly used by persons who came to have multiple visual and auditory disabilities from auditory disabilities and can use sign language); reading of tape of printed braille called blister; handwritten characters which are written on a palm; finger braille, i.e. a combination of six left and right fingers corresponding to six braille points, which are touched like keys of braille typewriter (which are mainly used by persons who came to have multiple visual and auditory disabilities from visual disabilities who can read braille). The finger braille is produced with the voice rhythm, so, it is easy to understand to persons with multiple visual and auditory disabilities who use finger braille daily. It can realize the voice transmission speed (350 syllables in about one minute). This is clear by an experiment. Accordingly, the keying interval of finger braille has important information. Furthermore, finger braille uses a code system at symbol level, so, recognition processing is unnecessary like the voice. It can be used also by persons with visual disabilities who can read braille. It is also a very stable input means.

6.7.7 Sign language and finger character display In order to display sign language and finger character, animation is used. In that case, the upper half of the body shall appear in the picture, and the screen resolution and display speed shall be sufficient to express at least sign language and finger character.

Information : Some persons with auditory disabilities use sign language as a main means of communication, and it may be difficult to understand the content by text explanation alone.

6.8 Time limit (input and output)

6.8.1 Time limit If a response from a user is necessary within the predetermined

time, or if there is time limit, then, the duration of time shall be adjustable or shall be able to be extended as necessary by a user with a prior warning given.

Information : Because of disabilities, it may take more time to input a response.

6.9 Operational error (input and output)

6.9.1 Automatic saving The results of operation shall be saved automatically. Users' operation shall permit to return to that point.

Information : Users with the reduced muscular force and paralysis, tremor and involuntary movement of a hand, for example, may end work without saving accidentally.

Remarks 1 Programs and, each data, etc. created by the software application shall be automatically saved as temporary files, during creation, at a certain interval or when the specified file size is reached. This function shall be provided.

2 If user's operational errors or external factors cause the system down or application stop, then, the function shall be provided to use those files and recover.

6.9.2 UNDO function The UNDO function shall be as follows:

a) In any situation, it shall be possible by a simple operation to return to the operation status of one step before.

b) Plural operations of UNDO shall return to the operation status of several steps before.

Remarks : Like transmission of e-mail, full deletion of a file, and a printer output, etc., the operation in which recovery is impossible once it is performed is not covered.

Information : Operational errors of a pointing device or a keyboard cause input of unnecessary characters, or moving to another operation screen.

Information : Persons with the reduced muscular force and paralysis, tremor and involuntary movement of a hand, etc. cannot perform correct operation and they require more time for operation.

Information : Persons with visual disabilities who cannot or can hardly see the screen require more time to understand the status of screen, and tend to make mistakes in input.

6.10 Status display (input and output)

6.10.1 Presentation of system information The status of setting/releasing with regard to the information accessibility function shall be presented to a user.

Remarks : For the status of setting/releasing with regard to the information accessibility function corresponding to users with visual disabilities and auditory disabilities, it is desirable that the mechanism to inform users through more than one sense organs is provided.

Example : The setting of whether the error information is presented by the voice or by the screen information shall be confirmed by both the

voice and the screen display.

6.10.2 State of input/output equipment The operation status of a keyboard, a mouse, a voice input device and all other input/output equipment should be judged by users themselves.

Information : Persons with low auditory ability due to auditory disabilities or aging cannot hear the buzzer sound or voice information which indicates errors, and they cannot cope with problems. Persons with low visual ability due to visual disabilities or aging cannot see the error message, etc. and other screen information, and they cannot cope with problems.

Example 1 It is desirable to offer the function that when the buzzer sound or voice information output is presented, a part of screen blinks, or the function that when the screen information such as error message is displayed, the sound or the voice is generated to inform of the status.

Example 2 In order to respond to persons with both visual and auditory disabilities, it is desirable to offer the function that information is presented through vibration and other tactile means.

Information : These functions will help users with intellectual disabilities use equipment.

6.10.3 Information of main equipment The means to easily acquire system configuration information of main equipment should be offered.

Information : When users desire to extend components of equipment or when users desire to increase capacity, users may want to know the present status of equipment. Users may require to obtain memory size and CPU capacity mounted on equipment, and other information on the internal status/configuration of main equipment, by using the input/output equipment which users usually use.

6.11 System setting (input/output)

6.11.1 Setting and releasing of function The setting and releasing of function shall be as follows:

a) Setting/releasing of information accessibility function shall be possible either individually or collectively.

Example : When the Shift key is pressed five times, the sequential input function becomes active.

b) The information accessibility function shall be provided, individually or collectively, with the function that it returns to an initial state automatically whenever a user finishes use.

Remarks : Other persons may use the same equipment. After users who use the information accessibility function finish their tasks, equipment is required to return automatically to the initial status. This function is selective. If it is known that the same user will use equipment next, equipment shall not return to the initial status, but it shall retain the

last status which that user used.

6.11.2 Customization of function For the customization of a function see the following:

a) Functions shall be customized so that users can easily create, save, compile and recall OS and application setting conditions.

Remarks : Changing shall be possible by a simple key/button operation

b) The setting conditions should be ready for use without restarting a system or an application.

Remarks : Changing should be possible on the spot without asking for the restart of a system or an application.

6.11.3 User-specific setup When equipment is allowed to be used by several users, plural setting where user-specific security functions for every user shall be available, and settings shall be changed automatically whenever users are switched.

Information : If users with disabilities including temporary illness or injury need resetting the environment (repeat interval, enlargement display ratio, etc.) at the time of startup of information processing equipment and its peripheral devices so that equipment is easy to use, operability lowers. When several users use a single unit of information processing equipment and its peripheral devices, the similar problem would arise.

Remarks 1 Equipment requires the function that it retains the setting of optimal conditions to each user and the setting can be used next time as it is, or the function that passwords, etc. can identify users.

2 However, users with the reduced muscular force and paralysis, tremor and involuntary movement of a hand may find it difficult to input the password for startup from a standard keyboard. For this reason, equipment requires the dedicated IC card, the function that user's iris and fingerprint are used for automatic identification, and the function that an alternative input device can be used from the time of switching on the power supply.

7 Requirements for support

7.1 Electronic document

7.1.1 Operation manual The product manual, etc. to be offered to users should be in an accessible electronic document.

Remarks 1 An electronic document should be offered without special conditions.

2 It is necessary to offer the electronic document equivalent to the print so that it is possible to read out with a screen reader, to change into braille data, to expand printing since it may be difficult to see the print due to visual disabilities.

7.1.2 Characteristics of product information accessibility and interchangeability Information on the product information accessibility and interchangeability shall be offered in prints and accessible electronic documents.

Remarks 1 In order for users to purchase the information processing equipment suitable to purpose, environment, degree of disabilities, etc. and to use it effectively, it is necessary to offer various information (product specification, availability of combination with products of other companies, Q & A, know-how about usage, consideration, etc.).

2 If any information for experts who support users is available, such information shall be offered together.

7.2 Education

7.2.1 Seminar When seminars and other opportunities for education are offered, it is desirable to correspond to them in consideration of trainees' characteristics and requests.

Remarks 1 When seminars are offered for users, diverse users shall be assumed. Texts shall be prepared in electronic formats so that they can be converted into voice, braille or the enlarged prints.

2 When explanation is made by text or orally, technical terms, words of foreign origin and abbreviations shall not be used abundantly. Intelligible expression shall be used.

3 When they are used, a glossary shall be prepared, or other considerations shall be given to help understanding.

7.3 Assistance for distribution channel

7.3.1 Provision of information to distribution channel Information on the product information accessibility and interchangeability should be offered to related dealers, information service companies, etc. and supporters, etc.

Remarks 1 In order for users to purchase the information processing equipment and its peripheral devices suitable to purpose, environment, degree of disabilities, etc. and to use it effectively, it is necessary to offer various information (product specification, availability of combination with products of other companies, Q & A, know-how about usage, consideration, etc.).

2 Upon purchase, in order for all users to be able to select the most suitable product, sales agent should be informed of information how products correspond to the degree of user's visual, auditory and other sensory abilities, physique, muscular force and other physical abilities, sentence comprehension and other cognitive abilities, etc.

7.4 Offer of opportunity of trial use

7.4.1 Rental It is desirable to offer users opportunities of trial use of equipment, and to offer actual equipment as rental.

Remarks : In order for users to confirm whether the equipment suits them or

whether they can use it well, it is desirable to perform a trial use for a certain period of time.

7.4.2 Download of trial version In the case of software, it is desirable that confirmation of whether it is available or not is possible by download of the trial version.

7.5 Establishment of service contact unit

7.5.1 Disclosure of service contact unit The service contact unit shall, in order to accomodate diversity of users, prepare several means to disclose information. Furthermore, the unit shall consider satisfactory communication with persons with disabilities.

Remarks 1 For persons with auditory and language disabilities who find it difficult to inquire by telephone, fax, e-mail, etc. are effective.

2 For persons with visual disabilities, presentation of information on home page is not sufficient. Telephone is effective.

3 Personnel of service contact unit shall have full understanding of not only products but also disabilities, information security, etc., and shall be able to fully communicate with users with disabilities.

4 It is necessary for the personnel of service contact unit to be able to correspond to inquiries for the information accessibility function of products and compatibility information.

7.6 Notice of upgrade and bug correction

7.6.1 Notice The information on upgrade and bug shall be informed to users in an accessible method.

Remarks 1 In order for users to effectively use the purchased information processing equipment and its peripheral device according to purpose, environment, degree of disabilities, etc., variety of information on products is necessary. Therefore, it is necessary to widely offer information on upgrade and bug, through service contact unit, personal computer communication, e-mail, web, etc.

2 The offered information shall be accessible.

3 Not only information for users, if there is also information for supporters who support users, such information shall be offered together.

7.6.2 Easy access to countermeasure Upgrade and bug correction should be so designed as to enable users themselves or supporters to easily perform it.

Remarks 1 Information on upgrade and bug correction shall be made accessible in compliance with this Standard. Furthermore, it is desirable to consider so that the users themselves can perform upgrade and bug correction.

2 It is desirable that upgrade and bug correction can be performed without needing the advanced expertise, even when a supporter's help is given.

Related standards:

JIS S 0011 *Guidelines for all people including elderly and people with disabilities —Marking tactile dots on consumer products*

JIS Z 8071 *Guidelines for standards developers to address the needs of older persons and persons with disabilities*

JIS Z 8530 *Human-centred design processes for interactive systems*

ISO 14915-2:2003 *Software ergonomics for multimedia user interfaces — Part2: Multimedia navigation and control*

ISO/TS16071: 2003 *Ergonomics of human-system interaction — Guidance on accessibility for human-computer interfaces*

Annex 1 (informative)
Problems encountered by older persons and persons with disabilities

Introduction This annex describes the definition of users as mentioned in this Standard, and does not constitute the provisions of this Standard.

This document is informative, but in order to realize the information accessibility, all the information processing equipment should be so designed as to meet the following requirements as much as possible.

The characteristics of users with a certain disability are diverse. Many different problems are encountered by older persons depending on, for example, their career, culture and the body region and severity of disability caused by aging, and by persons with disabilities, depending on the body region, severity, time of occurrence and subsequent circumstances of disability.

Therefore, they cannot be defined with a single scale. For example, the definition by visual acuity alone will likely exclude persons with tunnel vision, colour sense disability and other visual disabilities.

From such a reality, this Standard does not define "older persons and persons with disabilities".

Instead, examples of difficult situations encountered by older persons and persons with disabilities are presented as a reference to understand this Standard.

1 Characteristics of persons with disabilities and problems encountered by them

1.1 Outline The following explanation merely outlines typical problems encountered by persons with disabilities, and it is not comprehensive.

In addition, there are persons with multiple disabilities. The needs of those persons sometimes require simultaneous consideration of several items in this Standard. Sometimes, new difficulties caused by multiplication require separate consideration.

1.2 Visual disability The persons with visual disabilities are divided into the persons of total blindness or full loss of eyesight who cannot see or are scarcely able to see characters and surrounding areas, and the persons with a certain degree of low visual ability (amblyopia, tunnel vision, colour sense disability, etc.).

The persons with total blindness need to use non-visual interface (auditory and/or tactile) as a means to use a computer. The main problems for persons with total blindness are: how to obtain information presented visually, how to navigate between objects on the screen, how to identify those objects, how to control focus or navigation, and other functions through a keyboard.

Some persons with congenital total blindness learn braille, while many persons with acquired total blindness are poor at braille. At present, the voice synthesis technology has progressed so much that voice presentation technology is used in most cases. Braille-literate persons occupy less than 10 % of total population with visual disability.

Many persons with total blindness interact with a computer through "a screen reader". The screen reader is auxiliary software for presentation of information. It converts visual information displayed on the screen (window, menu, image, text, etc.) into voice or braille.

Such consideration about users consists mainly of consideration about characteristics of interaction performed via the screen reader. Higher dependence on the understanding of spacial metaphor of navigation and seeing the graphically expressed objects will increase the possibility that problems are encountered by persons with visual disabilities.

Rather than passive receiving of information from system, a dialog type is preferable, where information is obtained by active action from users.

Furthermore, many persons with total blindness read a screen through the synthesized voice output. Therefore, they find it difficult to pay simultaneous attention to auditory output from other devices. This should be borne in mind.

The persons with low visual ability refer to persons who need larger font sizes than default of standard screen display although they have residual eyesight or persons with tunnel vision who can grasp only a part of information displayed on a standard screen, and persons with colour sense disability.

The persons with defective visual acuity often find it difficult to read ordinary texts even if they use maximum correction. Defective visual acuity often means the blurred visual acuity, but it includes tunnel vision, colour sense disability (blending) and other problems.

The problems encountered generally by persons with low visual ability are: loss of visual clarity, colour sense disability, loss of contrast sense, and loss of depth sense.

The persons with low visual ability, depending on their respective visual needs, use various means to enlarge sizes of visual presentation, to increase contrast, or to increase overall visibility. The general assistive technologies are: large monitor, large font, high contrast, use of hardware or software to enlarge a part of display and so on.

Colour sense disability is mostly due to a hereditary cause. Four types are known. The disability is mostly prevalent among men. It is prevalent among about 5 % of Japanese men and about 8 % of white men. If minor disability is also included in counting, about 30 % is presumed to have the disability genetically. The combination of colours optimal to everybody is difficult to realize. Colours with widely different brightness should be combined.

The persons with low visual ability find it difficult to detect a size coding, to identify fonts, to find or trace interface objects such as pointer, cursor, drop target, hot spot and direct operation handle.

Furthermore, both persons with total blindness and persons with low visual ability find it difficult to read very small display, such as display on printer, copier, ticket machine, ATM (automated teller machine) etc.

1.3 Auditory disability The persons with auditory disability are divided into those with total deafness or full loss of hearing who cannot hear or are scarcely able to hear sound and voice and those with difficult hearing who can hear a sound if it is loud enough by their residual hearing ability (however, it shall be noted that there are persons who can hear a voice, but do not understand it because the voice is indistinctly heard.)

The persons with auditory disabilities, depending on the nature and severity of their disabilities, can or cannot use a hearing aid. The problems encountered generally by persons with total deafness are: difficulty to detect general auditory information, difficulty to pronounce correctly enough to activate a voice input system, experience of voice language as their second language and so on. [The persons with congenital deafness or persons who lost hearing while very young talk in sign language as their first language (mother tongue)].

When using a computer, these users encounter problems when important information is presented in auditory form alone. When available in OS, a "show sound" function which notifies software so that auditory information is presented in a visual form can be used.

The problems encountered generally by persons with difficult hearing are: difficulty to identify a change in frequency, loss or decrease of audible frequency range, difficulty to identify sound source, difficulty to differentiate voice from background noise etc. When using a computer, these users find it difficult to hear the voice of particular frequency or voice of low sound volume. Customization of sound quality will be a key to offer an access for these users.

Most of these problems apply to any users in the situations where voice is masked by background noise (for example, machine operation site) or voice is interrupted or cannot be used (for example, library).

1.4 Limb disability The persons with limb disabilities are those whose movement ability is limited considerably. The problems encountered by persons with limb disabilities are: lack of functions to coordinate movement, lack of muscular strength, difficulty to stretch arms, inability or difficulty of limb movement, etc.

There are many kinds of hardware and software which are used by the persons with limb disabilities according to disabilities. They are too many to be detailed here in the limited space. However, some examples are: an eye tracking device, an onscreen keyboard, speech recognition, alternative pointing device, etc.

However, some persons with dyskinesia due to cerebral palsy, etc. can hardly speak. Often, they cannot use a voice recognizer, etc. of the present technologies.

Some users can hardly manipulate objects directly, use a modification key (shift, control key, etc.), use a pointing device, or perform motion that needs exact movement and

timing. Furthermore, some users can hardly move and control a pointer in respect of a target, because their limbs tremble. When diversity of such user's needs and abilities are considered, customization of input parameters and timing is very important for effective access.

1.5 Cognitive disability The persons with cognitive disabilities find it difficult to receive information, to process information, to convey what they know and so on. The persons with such disabilities sometimes find it difficult to learn new things, to perform generalization, to establish relevance, to express themselves with spoken or written language and so on. The persons with attention-deficit hyperactivity disorder (ADHD) find it difficult to sit quietly to concentrate attention to their tasks.

The users with alexia find it difficult to read the text shown in a document format, to create a document text, etc.

The persons with alexia can be sometimes supported if someone reads aloud the highlighted text, or if a "legible" version of text is presented. The legible version of text is useful also for the users who do not have alexia.

The synthesized voice support that pronounces the written characters can be confirmed by hearing. So, it may support the persons with reading difficulty.

1.6 Older persons As the age advances, the older persons experience deterioration, in different severity, of visual, auditory, cognitive, and motion abilities. They may experience the limited ability to use human-computer interface and to have an access to it.

The older persons, as they become conscious of deterioration of their ability, may have a negative way of thinking. The accessibility functions, if they are provided as standard configuration, do not need any assistive tools or modification of equipment and enable the older persons to use a computer without hurting their pride. The older persons hate that aging is seen as a kind of disability.

1.7 Temporary disability The temporary disability refers to the state of having disability that is temporarily suffered, for example, due to fracture of an arm, pregnancy, etc. or many other cases. The users with temporary disabilities can hardly learn effectively and quickly the countermeasures against disability. Therefore, the accessibility functions for such disability need to be easy to find and to master. Furthermore, the temporary disability may be caused by the repetitive tension resulting from poor ergonomics, and intensive use of computer systems.

1.8 Multiple disability There are also many persons with some disabilities overlapped. For example, some persons with cognitive disability have low visual ability simultaneously.

Some guidelines for coping with a single disability may not apply to the persons with multiple disabilities. For example, the voice output of a document text does not support the persons with both auditory and visual disabilities. Accordingly, the support for such multiple disabilities needs to respond individually to the particular users and tasks.

1.9 Environmental disability The environmental disability is generated when the characteristics peculiar to the work environment cause difficulty to recognize signals from a computer.

For example, if you are working in a noisy environment, you can hardly hear signals from a computer. This situation is a kind of disability where users cannot work with the help of a computer. Although this is not a requirement to be specified by this Standard, the most direct solution is to improve the environment itself. If it is impossible, for instance in the case of airports, then, essential information should be presented in several different media.

Annex 2 (informative) Accessibility and usability

Introduction This annex describes the relationship between accessibility and usability specified in this Standard, and the concept of its realization form, and does not constitute the provisions of this Standard.

1 Accessibility and usability Information accessibility is a concept to indicate whether information communication equipment is accessible or not, while usability is a concept to indicate whether equipment is easy to use or not. However, the characteristics of users with a certain disability are diverse. Many different problems are encountered by older persons depending on, for example, their career, culture and the body region and severity of disability caused by aging, and by persons with disabilities, depending on the body region, severity, time of occurrence and subsequent circumstances of disability.

Accordingly, both accessibility and usability differ with individual users and user's requirements are diverse. It is often found that certain equipment is accessible to some users, but the same equipment is not accessible to other users.

Therefore, it is desirable to realize, as far as possible, such interfaces that are as diverse as possible and to enable each user to select the most suitable one among them.

2 Realization form There are several methods to realize various interfaces that are equipped with diverse functions and performance. They are: inclusion into standard configuration, supply of options, connection to assistive devices and so on.

Furthermore, the realization techniques are also diverse. They are: realization by hardware, realization by software, utilization of outside sources through network and so on.

This Standard assumes correspondence to these diverse realization methods. It is expected that each user can realize, depending on the technical advance and cost situation, the respective necessary functions in the appropriate form.

Annex 3 (informative) Consistency in other standards

Introduction This annex summarizes the relevant parts of other standards related to consistency referred to in this Standard, and does not constitute the provisions of this Standard.

1 Consistency in normative references Consistency is addressed in JIS Z 8524 and JIS Z 8525 as follows:

a) JIS Z 8524 (ISO 9241-14) Relevant parts are referred to as follows.

5.3.1 Consistency Options should be arranged consistently among the option group in the same relative sequence (see 5.2.1).

Example : Suppose that options in a certain menu panel are listed in the sequence of "file, edit, insert, print". Then, when the same option group is displayed, each option shall be listed in the same sequence.(When other menu panel including the same option group is displayed, the same arrangement shall be made.)

Information : When users are allowed to change the sequence of options, it is important that the sequence selected by users is retained until users change the sequence newly or until users restore the sequence to default.

7. Selection and execution of option

7.2 Alphanumeric keyboard When an alphanumeric keyboard is used to select and execute the menu options, it is desirable to adopt the method which is consistent and related to the task requirements and which meets the users' expectation. It is also desirable to minimize unnecessary input.

Information : Menu selection by a keyboard is suitable when a considerable amount of keyboard input is required for the task (namely, a user's fingers are almost always positioned on a keyboard).

7.2.7 Structure and syntax of specifier The structure and syntax of specifier should be consistent.

Example : A consistent coding system (for example, truncation) shall be used so that the same specifier may be given to the same option over the entire dialogue.

7.3 Function key When a function key is used to select menu options, the usage should be easy for users to understand and be consistent over a certain application.

Information : A function key can shorten the retrieval time of the options which are used frequently for the task. So, a function key is a suitable

method to select options which are used frequently and the options which are used on almost all menus.

7.3.4 Consistency of allocation When a certain menu option is activated from a function key on a keyboard, the option should be selected and executed consistently by the same function key.

Example : The HELP function shall always use the same key.

7.6.2 Consistency The voice input used for menu selection should be used consistently over any part of the task.

Remarks : When the voice and another method for menu selection are used together, the voice used as a selection means should serve as a clue to indicate which task is being executed. For that purpose, it is important to consistently allocate the voice input to a specific part (for example, a series of menu) of the task.

8.1.5 Display of option which cannot be used There is a possibility that the option which cannot be used now will be usable at another point of dialogue. When the consistency of spatial arrangement of a screen is important, it is allowable to display both options: a usable option and a non-usable option. However, in order to distinguish them, a visual encoding is desirable.

Example 1 A non-usable option is displayed in gray (this is desirable), or a usable option is displayed in the bold face.

Example 2 When colour display can be used, colour and brightness shall be changed to distinguish both options.

8.2 Arrangement Based on a user's expectation (for example, the past experience), the intuition of menu allocation, consistency of arrangement and ease of recognizing, arrangement should be realized so that a user may find it easy to look for options.

Information : Here, not only the voice menu but also the visually displayed menu is addressed.

8.2.1 Consistency of allocation

a) Menu of fixed number of options In the case of menu of the fixed number of options, the options should be placed at an absolute position (namely, the physically same position in the menu).

Example : "RETURN", "HELP", "END" and other frequently used options shall be placed at the same position in any menu.

b) Menu of variable number of options In the case of menu of the variable number of options, the options should be placed at a position where their relative position to other options does not change within the option group.

Example : The HELP options shall be placed at the end.

8.2.2 Title When the menu panel and the option group are titled, the title should be placed at the top of the panel or group. The title should be centred or justified at the left.

Remarks : It is important that the title is placed consistently through all the menus of an application.

8.2.4 Accelerator key In addition to selection by option specifiers, when selection by accelerator keys or shortcut keys are prepared, they should be justified at the right or the left and positioned adjacent to and on the right-hand side of the option names, with appropriate margin (at least 3 characters; in proportional font, at least 3 characters of average character width).

Example : print Alt+p
restart Alt+r
quit Ctrl+q

Remarks : As shown above, when characters are used as codes of accelerator keys, the characters should be consistent with the characters of specifiers (see 7.2.4).

8.3.7 Action and object options When the name of option indicates both action and object, it is recommendable to use a verb-noun phrase (if that phrase is not unnatural in the language used).

Example : "DELETE FOLDER"

Information : The consistency with the syntax of the language is more important than a verb-noun sequence. In Japanese, it is recommendable to use a noun-verb phrase [for example, "フォルダーを削除" (folder to be deleted)].

8.3.8 Transfer to command language The menu is used together with the command language. Or, if the menu is used to assist the transfer to the command language, the capitalization and syntax of the name of option should be consistent with the command language.

b) Z 8525 (ISO 9241-15) Relevant parts are referred to as follows:

Introduction The ultimate beneficiaries of this Standard are end users who use visual display terminals for their tasks. The ergonomics requirements specified in this Standard arise from these users' necessity. The end users may not read or even know this Standard. However, application of this Standard will offer the user interfaces which are easy to use, highly consistent, and helpful to increase productivity.

4.2 Consistency The command language should be internally consistent. The command of the same name should, irrespective of the status, perform the same function through the entire application. The command which has the same function should have the same name.

Information : If appropriate, this rule does not preclude the use of synonyms.

4.5 Syntax

b) Consistency within modality The syntax should be consistent within one modality.

Example : In the command dialogue which uses the screen, the sequence of action first and object next (namely, action-object syntax) should be consistent.

c) Consistency between modalities Even if modality differs, the syntax should be

as consistent as possible.

Example : When the voice, in addition to key input, is used for input of command, both voice and key input shall adopt the object-action syntax.

4.6 Delimiter of commands When several commands are input collectively all at once, commands should be divided with a simple and consistent delimiter.

b) Standard symbol When the system limitation requires use of the delimiter other than a space to divide several commands as a group, a simple and standard delimiter should be used consistently.

Example : Like the command string "SORT/FORMAT/PRINT", a slash mark "/" should be used.

4.8.4 Delimiter of arguments

b) Other delimiters When the system limitation requires use of the delimiter other than a space to divide several arguments, a simple and standard delimiter should be used consistently.

Example : Like the command string "PRINT fileA, fileB, and fileC", a comma (,) should be used.

5.3 Function key and hot key

5.3.1 General When a function key or a hot key is used for command input, the usage should be clear for an user, or the allocation of key is easy to refer and consistent within an application.

Information : When the command is frequently used, or the speed of command input is regarded as important, use of a function key or a hot key shall be studied.

5.3.2 Consistency of function key When function keys are used for command input, allocation of function keys to commands should be consistent over the related task within an application. The general command, such as "HELP" should be especially consistent.

5.3.3 Consistency of hot key When hot keys are used for command input, the same meaning should be given to those keys within an application.

Remarks : When a command can be called by menu dialogues like by key input, allocation of hot keys should be the same as shortcut keys used within the menu.

Example : When alt/c is used to express "cancel", its correspondence shall be retained consistently within an application.

5.3.4 Consistent use of modifying keys When modifying keys (for example, "Ctrl key" or "alt key") are used in combination with other keys, the usage of modifying keys should be consistent.

Example : A combination of "Alt key" and a character key is used for window operation. A combination of "Ctrl key" and a character key is used for data operation.

6.10 Display of keyed command

a) Consistent input position The user's input should be displayed repeatedly at a consistent position.

Example : The input shall be dispalyed at the "command line" of bottom line of screen, or after the prompt on the display screen.

6.12 Consistent output format The command which produce similar or related output should present the data of result in a consistent format (see ISO 9241-12).

Example : The listing display such as FILE, PROCESS, DIRECTORY, etc. uses the same display format.

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